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EXAMINER	
REARDON, ROCHELLE D	

ART UNIT	PAPER NUMBER
4185	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/578,979	POLAND, MCKEEN DUNN	
	Examiner	Art Unit	
	ROCHELLE REARDON	4185	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 May 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/11/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 5, 6, 14-16, and 18 objected to because of the following informalities: it is unclear as to what further structural limitations have been set forth. Claim 5 discloses at least on plane orientation parameter which is selectable via the user input device. The user input device is disclosed in claim 1 from which it depends, in which an automatic adjustment parameter may be selected. Claim 6 discloses a series of images as a 3-D image, and does not set further structural limitations. Claim 14 discloses a each image of the series as a 2-D image, and does not set a further structural limitation for acquiring. Claim 15 depends from claim 14 in which the orientation of a plane is determined by a predefined plane orientation parameter. Claim 16, discloses a series of images as a 3-D image, and does not set further structural limitations. Claim 18, discloses providing for shifting positioning with respect to a previous image acquisition, but does not further set a structural limitation, as it depends from claim 11 which discloses a control unit to adjust parameters. Appropriate correction is required.

Drawings

1. The drawings are objected to because the boxes should be labeled as to the elements that they represent. Reference numerals alone are insufficient. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the

sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 3-4, 7, 10 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by **Maslak et al (US 5,148,810).**

Regarding claims 1 and 20, Maslak et al discloses an ultrasound imaging system for acquiring images by transmitting ultrasonic pressure waves and receiving returned echoes on a set of spatially non-over-lapping acoustic lines scanned along a

transducer array (column 2, lines 53-59). A receive beamformer continually switches from one focus to the next to accurately tracks information along the desired acoustic scan line (column 12, lines 5-22). The receive apodization generator controls the active receive aperture during beamforming. An extension of each acoustic line may also pass through a substantially common vertex that is not on the face of the transducer array, but preferably behind it a selectable distance to provide an extended field of view (abstract; column 5, lines 35-40; fig. 5).

Regarding claim 3, Maslak et al discloses a set of spatially non-over-lapping acoustic lines scanned along a transducer array (column 2, lines 53-59). In addition, each acoustic line may also pass through a substantially common vertex that is not on the face of the transducer array, but preferably behind it a selectable distance to provide an extended field of view (abstract; fig. 5).

Regarding claim 4, Maslak et al discloses multiple pulsed Doppler scan lines with variable vertices that are distinct from each other in combination with a 2-D image (column 6; lines 52-55).

Regarding claim 7, Maslak et al discloses a receive apodization generator which controls the active receive aperture. A time delay is calculated in order to vary the focus between acquisitions (column 12, lines 22-40).

Regarding claim 10, Maslak et al discloses a transducer array which is planar, linear or curvilinear (column 2, lines 65-67).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 2, 5-6, 8-9, 11-19, 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Maslak et al (US 5,148,810)** in view of **Byrd et al (US 2005/0080336).**

Regarding claim 2, Maslak et al discloses an ultrasound imaging system for acquiring images (column 2, lines 53-59). In addition, a control unit is disclosed in which the receive apodization generator controls the active receive aperture during beamforming (abstract; column 5, lines 35-40; fig. 5).

Maslak et al fails to disclose circuitry for receiving a plurality of trigger signals, including an asynchronous event, and acquiring images in response to a trigger signal.

6. However, Byrd et al teaches a medical imaging system which may use ultrasound a signal generator to obtain a trigger signal corresponding to a timing of interest. The imaging equipment is configured to obtain a plurality of images of a feature of interest. The trigger signal may correspond to a physiological condition sensed (paragraph 8, lines 14).

Given the teachings of Byrd et al, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the ultrasound imaging system of Maslak, with the ability to acquire a series of images in response to a trigger signal.

Doing so would provide the ability to acquire image data with respect to a physical condition of interest.

Regarding claims 5 and 15, Maslak et al discloses a selectable distance for the transducer array to provide an extended field of view (abstract, fig. 5). Maslak fails to disclose a selectable plan.

7. However, Byrd et al teaches a medical imaging system which electronically steers an ultrasound beam in two or three dimensions in an imaging plane (paragraph 18, lines 7-10).

Given the teachings of Byrd et al, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the ultrasound imaging system with a selectable transducer array distance, with the ability to select an imaging plane.

Doing so would provide the ability to image on plane which is found to be of most interest.

Regarding claims 6 and 16, Maslak et al discloses an ultrasound imaging system for acquiring images in which multiple pulsed Doppler scan lines with variable vertices that are distinct from each other in combination with a 2-D image (column 6; lines 52-55). Maslak et al fails to disclose a serious of 3-D images.

8. However, Byrd et al teaches a medical imaging system which may use ultrasound in which a desirable embodiment in which the 3-dimensional images are displayed (paragraph 25, lines 3-4).

Given the teachings of Byrd et al, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the ultrasound imaging system of Maslak, with a series of 3-dimensional images.

Doing so would provide the ability to view the image data acquired in all dimensions.

Regarding claims 8 and 12, Maslak et al discloses an ultrasound imaging system for acquiring images (column 2, lines 53-59). In addition, a control unit is disclosed in which the receive apodization generator controls the active receive aperture during beamforming (abstract; column 5, lines 35-40; fig. 5). Maslak et al fails to disclose a trigger signal in which at least one cardiac cycle signal is generated by an electro-cardiograph generator and at least one respiration cycle.

9. However, Byrd et al teaches a medical imaging system which may use ultrasound and a signal generator configured to obtain a trigger signal corresponding to a timing of interest. The signal generator may include at least one sensor, such as an intra-cardiac electrocardiograph to sense a physiological condition of a patient. In

addition, the obtained trigger signal is said to "time gate" the plurality of images, because the plurality of images are obtained in accordance with a timing of interest.

Given the teachings of Byrd et al, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the ultrasound imaging system of Maslak, with a trigger signal which is based on a cardiac cycle and respiratory gating device.

Doing so would provide the ability to acquire image data with respect to a physical condition of interest.

Regarding claim 9, Maslak et al discloses a format for spectral and color flow Doppler scanning with mixed modes which enhance the utility of variable vertex scan and display format (column 6, lines 46-49). Maslak et al fails to disclose a series of images processed for being display using display persistence.

10. However, Byrd et al teaches a medical imaging system in which the image intensity of a fluorometer which should be adjusted or compensated as well to correct for increasing and decreasing the image brightness (paragraph 67, lines 14-16).

Given the teachings of Byrd et al, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the ultrasound imaging system of Maslak, with the ability to adjust image intensity.

Doing so would provide for optimum viewing of physiological aspects of the image.

Regarding claims 11 and 22, Maslak et al discloses an ultrasound imaging system and method for acquiring images by transmitting ultrasonic pressure waves and

receiving returned echoes on a set of spatially non-over-lapping acoustic lines scanned along a transducer array (column 2, lines 53-59). A receive beamformer continually switches from one focus to the next to accurately tracks information along the desired acoustic scan line (column 12, lines 5-22). The receive apodization generator controls the active receive aperture during beamforming. An extension of each acoustic line may also pass through a substantially common vertex that is not on the face of the transducer array, but preferably behind it a selectable distance to provide an extended field of view (abstract; column 5, lines 35-40; fig. 5). Maslak fails to disclose circuitry for receiving a plurality of trigger signals, including an asynchronous event, and acquiring images in response to a trigger signal.

11. However, Byrd et al teaches a medical imaging system which may use ultrasound and a signal generator to obtain a trigger signal corresponding to a timing of interest. The imaging equipment is configured to obtain a plurality of images of a feature of interest. The trigger signal may correspond to a physiological condition sensed (paragraph 8, lines 14).

Given the teachings of Byrd et al, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the ultrasound imaging system of Maslak, with the ability to acquire a series of images in response to a trigger signal.

Doing so would provide the ability to acquire image data with respect to a physical condition of interest.

Regarding claim 13, Maslak et al discloses a receive beamformer continually switches from one focus to the next to accurately tracks information along the desired

acoustic scan line (column 12, lines 5-22). The receive apodization generator controls the active receive aperture during beamforming. The receive focus can always be placed on the ultrasound scan line axis. An extension of each acoustic line may also pass through a substantially common vertex that is not on the face of the transducer array, but preferably behind it a selectable distance to provide an extended field of view (abstract; column 5, lines 35-40; fig. 5).

Regarding claim 14, Maslak et al discloses multiple pulsed Doppler scan lines with variable vertices that are distinct from each other in combination with a 2-D image (column 6; lines 52-55).

Regarding claim 17, Maslak et al discloses a receive apodization generator which controls the active receive aperture. A time delay is calculated in order to vary the focus between acquisitions (column 12, lines 22-40).

Regarding claim 18, Maslak et al discloses an ultrasound imaging system for acquiring images by transmitting ultrasonic pressure waves and receiving returned echoes on a set of spatially non-over-lapping acoustic lines scanned along a transducer array (column 2, lines 53-59). An extension of each acoustic line may also pass through a substantially common vertex that is not on the face of the transducer array, but preferably behind it a selectable distance to provide an extended field of view (abstract; column 5, lines 35-40; fig. 5).

Regarding claim 19, Maslak et al discloses a transducer array which is planar, linear or curvilinear (column 2, lines 65-67).

Regarding claim 21, Maslak et al discloses an ultrasound imaging system for acquiring images by transmitting ultrasonic pressure waves and receiving returned echoes on a set of spatially non-over-lapping acoustic lines scanned along a transducer array (column 2, lines 53-59). Maslak et al fails to disclose receiving a plurality of trigger signals including a control step of acquiring respective images in response to receipt of at least one trigger signal.

12. However, Byrd et al teaches a medical imaging system which may use ultrasound and a signal generator to obtain a trigger signal corresponding to a timing of interest. The imaging equipment is configured to obtain a plurality of images of a feature of interest. The trigger signal may correspond to a physiological condition sensed (paragraph 8, lines 14).

Given the teachings of Byrd et al, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the ultrasound imaging system of Maslak, with the ability to acquire a series of images in response to a trigger signal.

Doing so would provide the ability to acquire image data with respect to a physical condition of interest.

Regarding claim 23, Maslak et al discloses an ultrasound imaging system for acquiring images by transmitting ultrasonic pressure waves and receiving returned echoes on a set of spatially non-over-lapping acoustic lines scanned along a transducer array (column 2, lines 53-59). Maslak et al fails to disclose a method including a trigger signal in which at least one cardiac cycle signal is generated by an electro-cardiograph generator and at least one respiration cycle.

13. However, Byrd et al teaches a medical imaging system which may use ultrasound and a signal generator configured to obtain a trigger signal corresponding to a timing of interest. The signal generator may include at least one sensor, such as an intra-cardiac electrocardiograph to sense a physiological condition of a patient. In addition, the obtained trigger signal is said to "time gate" the plurality of images, because the plurality of images are obtained in accordance with a timing of interest.

Given the teachings of Byrd et al, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the ultrasound imaging system of Maslak, with a trigger signal which is based on a cardiac cycle and respiratory gating device.

Doing so would provide the ability to acquire image data with respect to a physical condition of interest.

Regarding claim 24, Maslak et al discloses an ultrasound imaging system which the method includes acquiring images by transmitting ultrasonic pressure waves and receiving returned echoes on a set of spatially non-over-lapping acoustic lines scanned along a transducer array (column 2, lines 53-59). An extension of each acoustic line may also pass through a substantially common vertex that is not on the face of the transducer array, but preferably behind it a selectable distance to provide an extended field of view (abstract; column 5, lines 35-40; fig. 5).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROCHELLE REARDON whose telephone number is (571)270-7104. The examiner can normally be reached on Monday thru Friday, 9:00 A.M. to 5:00 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on (571)272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ROCHELLE REARDON/
Examiner, Art Unit 4185

/Ruth S. Smith/
Primary Examiner, Art Unit 3737